

US EPA ARCHIVE DOCUMENT

Attachment 3				
	Line No.	Source	Methodology	
CURRENT WWT COSTS				
1	Annual O&M Expense (excl. depr.)	100	O&M - Financial Statements, most current year. Annual Equipment Purchases - Current budget, Fund 401 (MSD), Agency 410 (Office of the Director), Object 7600 (Office/Tech Equipment) and Object 7615 (Motorized Equipment)	Total O&M from Financial Statement, (not including depreciation) plus Annual Equipment Purchases, which includes Office/Tech Equipment and Motorized Equipment
2	Annual Debt Service	101	Audited Financial Statements, most current year	Total principal and interest payments from all debt, as listed in Notes to Audited Financial Statements
PROJECTED WWT AND CSO CAPITAL COSTS				
3	Estimated Additional Annual Expenditures Projected O&M for WWIP	103a	Reasonable, documented MSDGC Engineering Estimates	Total additional O&M (in current year dollars, excluding inflation) expected at the conclusion of the ensuing Phase (or subpart) from implementation of the total capital program (WWIP and asset management) or other sources (e.g., benefits, new regulator requirements).
4	Estimated Total Cash Financed Capital	103b	Reasonable, documented MSDGC Engineering Estimates and MSDGC Rate Model	Amount of cash financed capital for total capital program (WWIP, Asset Management and other capital costs), in current year dollars.
5	Total CSO Capital Costs (debt financed)	104a	Reasonable, documented MSDGC Engineering Estimates and MSDGC Rate Model	Amount of debt financed capital for WWIP based on calculation of required debt financed capital after taking into account other expected funding sources (e.g. cash financed capital, connection fee revenue, certain interest income).
6	Total WWT Costs, including Asset Management and Other Capital Costs (debt financed)	104b	Reasonable, documented MSDGC Engineering Estimates and MSDGC Rate Model	Amount of debt financed capital for WWT Capital (including Asset Management and other non-WWIP capital) costs based on calculation of required debt financed capital after taking into account other expected funding sources (e.g. cash financed capital, connection fee revenue, certain interest income).
7	Bond Interest Rate, Term, and Amount	104c	Amount of debt financing determined by most recent rate study. Other expected funding sources (e.g., SRF loans, grants, etc.) would be incorporated into computations model, with appropriate rate and term applied)	Opinion of expert in municipal revenue bond financing on expected bond interest rate(s) and bond term(s) (years), based upon existing and anticipated market conditions, MSDGC financial condition, bond rating, MMD General Municipal Revenue Bond Index (or then available and applicable municipal bond market indexes), and other relevant factors.
8	Residential Share	107	Based on industry accepted standards and consistent with the most recent MSDGC Rate Study, utilizing MSDGC billing records and treatment plant records.	Rate model calculations based on most recent full year data and consistent with most recent MSDGC rate study. Rate model calculates total infiltration/inflow, and allocates such to customer classes based on industry accepted standards. Sum of contributed volume and allocated infiltration/inflow results in total share per customer class. Residential share is sum of Residential and Multifamily customer classes. (see attached example)
9	Total Number of households in area	108	Based on its billing database and/or GIS, MSDGC will provide information that identifies, by map or geographic unit (e.g., ZIP or place) the areas served by its sewers.  Most recent data available from the Census Bureau, including both the Decennial Census and the American Community Survey, will be collected for all geographic units that are wholly or partially within these areas.	Using American Community Survey data, all households within a geographic unit served in its entirety will be included in the estimate. The household estimate for each sewer area that is part of a larger geographic unit will be based on a determination of the proportion of that unit that is served by MSDGC sewers. The overall estimate will be the sum of the estimates for the individual geographic units (less the number of households determined to be served by septic or other package systems).
10	Median Household Income (MHI)	201	same as line 108	Using American Community Survey data (see note below), households by income will be aggregated for all geographic units served in their entirety and for the appropriate proportions of partially served geographic units. The median household income of the entire area will be estimated by calculating a median for the aggregated household income distribution (assuming all households within an income range are evenly distributed across that range), and adjusting that figure by the ratio of the reported median to the calculated median for Hamilton County. (See attached example)
Line 10 Note re use of American Community Survey (ACS) data: Step 1: calculate using most recent three-year ACS estimates for the entire service area. Step 2: calculate using one-year ACS estimates for those geographic entities where that data is available (currently, populations more than 65,000). Step 3: add the results of Steps 1 and 2 and divide by 2.				

## Example of MHI Calculation

**Step 1:** Using the American Community Survey (ACS), gather data on households by income level in each geographic unit served (as determined in calculation of Line 108). Estimates for each sewerage area that is part of a larger geographic unit will be based on a determination of the proportion of that unit that is served by MSDGC. MHI data for some geographical units may overlap, and proper adjustments must be made. For example, if one geographic unit is the City of Cincinnati and another is Hamilton County as a whole, then the appropriate household figure for the Hamilton County unit would be based on County households less City households.

**Step 2:** Sum households across all units served for each income bracket to arrive at the total distribution of households in the service area by income level.

**Step 3:** Calculate cumulative households by income group.

**Step 4: Calculate Service Area MHI**

- > Find the median household by adding one to total households and dividing by two (Line A).
- > Determine the income bracket in which the median household is located by comparing the value calculated in Line A to the cumulative household column (in this example it is the \$30,000 to \$34,999 bracket, highlighted in red).
- > Take the value calculated in Line A and subtract cumulative households in all income brackets preceding the bracket that contains the median household to find the numbered location of the median household within the median income bracket (Line B).
- > Divide the value from Line B by the number of households in the medium income bracket to get the percentage of households in the median income bracket lower than the median household.
- > Multiply the percentage from Line C by the range of the median income bracket (Line D).
- > Add the value from Line D to the lower bound of the median income bracket to arrive at the preliminary MHI value for the service area.
- > Adjust the preliminary MHI value based on the ratio of the county's reported MHI to the MHI calculated by using this methodology.

	Unit 1	Unit 2	Unit 3	Unit 4	Service Area	Cumulative	County
Total pop:	1,297	2,156	7,797	4,486	15,736		26,850
Total hhlds:	590	1,087	2,528	1,435	5,640		9,363
Less than \$10,000	0	26	16	0	42	42	105
\$10,000 to \$14,999	27	17	81	73	198	240	448
\$15,000 to \$19,999	26	24	164	104	318	558	728
\$20,000 to \$24,999	55	30	265	163	513	1,071	861
\$25,000 to \$29,999	48	87	424	286	845	1,916	1,419
\$30,000 to \$34,999	162	196	683	325	1,366	3,282	2,008
\$35,000 to \$39,999	29	236	360	189	814	4,096	1,325
\$40,000 to \$44,999	79	192	130	120	521	4,617	680
\$45,000 to \$49,999	9	30	57	30	126	4,743	310
\$50,000 to \$59,999	10	74	107	32	223	4,966	363
\$60,000 to \$74,999	21	80	81	55	237	5,203	321
\$75,000 to \$99,999	32	35	52	7	126	5,329	232
\$100,000 to \$124,999	31	39	40	0	110	5,439	182
\$125,000 to \$149,999	9	11	57	16	93	5,532	193
\$150,000 to \$199,999	33	10	11	11	65	5,597	107
\$200,000 or more	19	0	0	24	43	5,640	81
Median household income							\$32,363
Calculated MHI							\$32,790
Actual MHI as % of Calc. MHI							98.7%

Line	Service Area Calculated MHI
A	2,821
B	905
C	66.22%
D	3,310
E	\$33,310
F	<b>\$32,876</b>

**Table 1**  
**2006 Data**

	<u>Equivalent Meters</u>	<u>Billed Volume</u> <i>ccf</i>	<u>Customer</u> <i>ccf</i>	<u>I/I</u> <u>Volume</u> <i>ccf</i>	<u>Total</u> <i>ccf</i>	<u>Total</u> <i>ccf</i>
<b>By Customer Class</b>						
Resid-Q	231,193	16,797,000	19,327,200	3,840,175	23,167,375	39,964,375
Comm-Q	45,054	3,475,900	3,766,400	794,700	4,561,100	8,037,000
Ind-Q	10,225	1,013,700	854,800	231,800	1,086,600	2,100,300
MF-Q	22,130	3,321,300	1,850,000	759,300	2,609,300	5,930,600
Resid-M	624	1,158,400	52,200	264,800	317,000	1,475,400
Comm-M	5,581	4,887,100	466,600	1,117,300	1,583,900	6,471,000
Ind-M	20,275	10,188,300	1,694,900	2,329,300	4,024,200	14,212,500
Total	335,082	40,841,700	28,012,125 75.0%	9,337,375 25.0%	37,349,500	78,191,175
<b>Total Residential</b>		21,276,700	52.1%			47,370,375 60.6%

### Excerpt from 2005 Rate Study.

Wastewater collected and treated by the District consists of two elements: (1) contributed sanitary wastewater flow, and (2) infiltration/ inflow of ground water and stormwater runoff into the sewers. Contributed wastewater flow is that portion of the annual water use or other discharge of each customer class which enters the sanitary wastewater system. Estimates of the contributed volume of each class is generally based upon wastewater billing records that exclude estimated water use not reaching the wastewater system, such as that used for lawn sprinkling and car washing or included in manufactured products.

Based on a historical analysis, it is estimated that the amount of flow entering the sewers through I/I will average 48 percent of the total wastewater flow reaching the treatment plants. Each customer class should bear its proportionate share of the costs associated with I/I as the wastewater system must be adequate to convey and process the total flow. Recognizing that the major cost responsibility for I/I is allocable on an

wastewater system. Estimates of the contributed volume of each class is generally based upon wastewater billing records that exclude estimated water use not reaching the wastewater system, such as that used for lawn sprinkling and car washing or included in manufactured products.

Based on a historical analysis, it is estimated that the amount of flow entering the sewers through I/I will average 48 percent of the total wastewater flow reaching the treatment plants. Each customer class should bear its proportionate share of the costs associated with I/I as the wastewater system must be adequate to convey and process the total flow. Recognizing that the major cost responsibility for I/I is allocable on an individual connection basis, three-fourths of the I/I volume is allocated to customer classes based on estimated customer equivalent connections with the remaining one-fourth allocated on the basis of contributed volume.

The responsibility for collection system capacity cost varies with the estimated peak flow rates of contributed wastewater and infiltration attributable to each customer class. Infiltration/inflow is estimated to comprise 64 percent of the total peak flow.

